



USAFA *Discovery* is published quarterly by the faculty of the US Air Force Academy (USAFA). It contains reports on USAFA cadet and faculty research, a complete list of current USAFA research points of contact, and a summary of recent awards and publications. All written material contained within reflects the opinions of the authors and editors and does not necessarily reflect current US Air Force or USAFA policy.

Cadets Begin Fabrication of Satellite for Launch

Cadets in the class of 1999 are turning their design into reality as they build the Academy's first free-flying satellite, FalconSat-I. The spacecraft is scheduled for launch in September 1999. The cadet teams completed critical design milestones in December and have begun the hardware fabrication, testing, and integration phases. The teams are also responsible for the scheduling and budgetary phases of the mission.

Faculty and cadets from several departments are critical to the success of the FalconSat-I project. Cadets majoring in Astronautics, Computer Science, Electrical Engineering, Space Operations, Engineering Mechanics, Management, and Physics are enrolled in the Small Spacecraft Engineering course (Engr 434) that will fulfill the goal of delivering the satellite for launch. Faculty mentors from each of these departments guide the cadets' progress toward this achievement.

Spacecraft hardware and ground test equipment are fabricated in the Astronautics laboratory located in the Consolidated Education Training Facility (CETF). The cadets are organized into teams dedicated to completing a portion of the project. The teams are managed through a cadet management structure. The teams include systems engineering, structures, communications, attitude determination and control, software and data handling, electrical power, launch vehicle integration, ground station, and testing. Fig. 1 shows cadets working with the flight hardware.

Plans for the spring semester include completing fabrication of the major satellite subsystems in February. The subsystems will be integrated together and tested during March and April. Final delivery of the satellite is planned for May 1999. The spacecraft will be fitted to the launch stack and mated to the launch vehicle throughout the summer months.

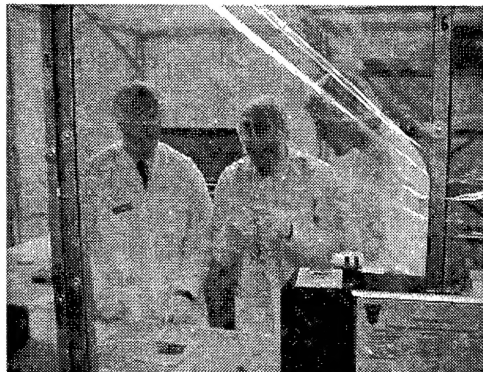


Fig. 1. Spacecraft Fabrication Activity in CETF. C1Cs Jim Taggart, Justin Hendricks, and Scott Karl (left to right) prepare to test the communications system modem in the small satellite clean room.

Once on orbit, cadets will operate the spacecraft in the new satellite ground station. Installation of the antennas on the roof of the CETF, as well as the ground station equipment has been completed. Cadets majoring in computer science are developing the ground station software. The software will be used to operate the satellite and receive science data and health and status information when the spacecraft is in view of the Academy. Cadets are developing the software through their course work in Software Engineering I & II (Comp Sci 453/454).

What will the spacecraft actually do? FalconSat-1 is a small satellite carrying the Charging Hazards and Wake Studies-Long Duration (CHAWS-LD) experiment. The purpose of the mission is to determine the effects of spacecraft charging in a low-earth orbit over a time period of at least six months. The primary objectives of the mission are to (1) Provide data that will allow scientists to analyze the effects of charging on spacecraft in low-earth orbit over an extended time period; (2) Validate FalconSat-1 system design by transmitting telemetry data, gathered by the different subsystems of the spacecraft bus, to the mission control center; (3) Provide a flight experience with new computer hardware and

software developed for the program; (4) Provide a ground station test bed for education and training purposes and allow cadets to gain hands on experience in space operations.

How long will FalconSat-1 remain aloft? The cadets plan to collect science data for about a year after launch, and will operate the spacecraft as long as possible. The orbit of the spacecraft will decay over time, and the satellite will burn up in the upper atmosphere in roughly 17 years.

What are the potential military applications of the satellite? The FalconSat-1 mission addresses military requirements for space-based environmental sensors and questions about spacecraft charging for the design of future DoD satellites. Previous DoD satellites have been killed by this effect--sensitive electronics were destroyed by spurious voltages and currents in the satellite.

For more information, contact the satellite and science experiment principal investigators:

Major Bruce Chesley
HQ USAFA/DFAS
2354 Faculty Drive, Suite 6H68
USAFA CO 80840
ChesleyBC.DFAS@usafa.af.mil
(719) 333-3315

Capt Bill Pakula
HQ USAFA/DFP
2354 Faculty Drive, Suite 2A89
USAFA CO 80840
PakulaWA.DFP@usafa.af.mil
(719) 333-4158
→

In this issue:

- **Lead articles:** Cadets begin Fabrication of Satellite for Launch, Designing High-Speed Vehicles for the USAF (pages 1-2)
- Department Research News (page 3-4)
- Publications and Presentations (pages 4-11)

Designing High-Speed Vehicles for the U.S. Air Force

The High-Speed Vehicle Design Group (HSVDG) of the Aeronautical Research Center (ARC) of the USAFA is involved in a wide variety of activities that support the design of high-speed vehicles, many of which will be part of the 21st century inventory of the USAF. The HSVDG includes several cadets working together with DFAN faculty on a variety of projects.

Nine cadets supported the Air University's Program: "Air Force 2025" by working a study meant to address these questions: "What Air Force Missions are Best Accomplished by Hypersonic Vehicles?" and "What Vehicles Might Be Developed to Accomplish These Missions?" The cadets proposed an integrated weapons system featuring a global-reach/global-power aircraft capable of reaching any point in the world within hours without relying on foreign bases and delivering either hypersonic cruise missiles at extremely high-value targets or serving as the first stage of a two-stage-to-orbit space access system. More specifically, the global-reach hypersonic aircraft would be able to deliver hypersonic cruise missiles anywhere in the world in a matter of hours, operating from bases in the continental U.S. Thus, it would be able to deliver decisive blows at the outset of hostilities, with the goal of destroying the adversary's desire to fight a protracted war, or deliver cost-effective weapons to defeat time critical targets and to establish in-theater dominance, if a protracted war cannot be avoided. The ability of the combined weapons system being able to strike targets anywhere in the world within hours without the need for forward basing generates savings in time and money that justify the cost of designing, building, and deploying the weapons system. The access-to-space missions would also be conducted during peacetime to develop operational procedures, which can be applied to war-time operations should hostilities break out.

The hypersonic aircraft, was designated the Supersonic/Hypersonic Attack Aircraft, or SHAFT, shown in Figure 1, and the hypersonic cruise missile, shown in Figure 2, was designated the Standoff Hypersonic Missile with Attack Capability, or

SHMAC: so what could be more a appropriate motto for this weapons system than "When the SHMAC hits DFAN"?

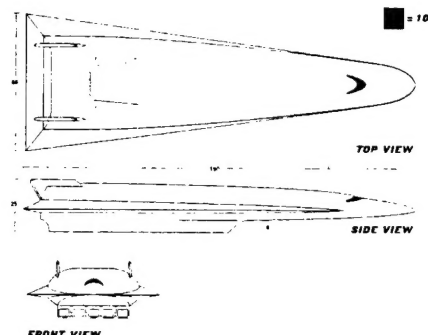


Figure 1. Conceptual design, developed by cadets, of a supersonic/hypersonic Attack Aircraft (SHAFT)

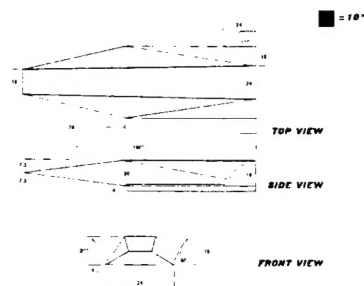


Figure 2. Conceptual design, developed by cadets, of a Stand-off Hypersonic Missile with Attack Capability (SHMAC)

The mission and vehicle configuration concepts developed by the cadets contain many of the features that would be incorporated into the design of a hypersonic weapon system. Indeed, the results of the study were published in the "Air Force 2025" documentation and which were presented by the then 2nd Lieutenants at the AIAA 7th International Space Planes Conference on which was held in Norfolk, VA in November 1996. Large sections of this study were excerpted verbatim and reproduced in a recently published volume, *Stealth Aircraft of the U. S. Air Force*.

Currently active in the research activities of the HSVDG are C1C Evan Gallegos, C1C Tim Pesek, Lt. Col. Steve Pluntze, Maj. Scott Morton, Capt. Jim Forsythe, Capt. Colin Tucker, Capt. Matt Zuber, and Dr. John Bertin. They receive support in the building and the

testing of models in the Tri-Sonic Wind Tunnel (TWT) from Bobby Hatfield, Tim Hayden, Larry Lamblin, and Jim Philp. This research team integrates measurements made in the TWT with flowfield parameters computed using available Computational Fluid Dynamics (CFD) codes to develop an understanding of the flowfields for future weapons systems. The experimental data include global parameters, such as force and moment measurements, local parameters, such as static pressures measured at specific locations on the model, and flow visualization data, such as schlieren photographs and surface oil-flow patterns.

One current project, which is funded through the Air Force Research Laboratory at Eglin AFB, seeks to develop an understanding of the complex flowfield that results when reaction control jets are used to maneuver asymmetric missile configurations. Reaction control jets can be used to produce spectacular maneuvers ("Check your six!"). However, the jet plume creates significant perturbations to the flowfield, resulting in locally severe heat-transfer rates and in locally high pressures. These perturbations must be understood and controlled, if the designers are to use these jets successfully.

Dr. Bertin has been invited to give a paper describing some of the team's activities to the JFASS 13th International Sessions in the 37th Aircraft Symposium to be held in October 1999 in Tokyo Japan. The paper will review the results from four different recent, research programs in which measurements from wind-tunnel programs were compared with the corresponding parameters generated using state-of-the-art CFD codes to evaluate the effect of grid-spacing on the computed solutions, to evaluate the degree of rigor required in developing numerical tools, to better understand the physical phenomena depicted by the data, and to develop a better understanding of the complex hypersonic flowfields on the design of future vehicles.

In addition to using existing computational codes to support the design activities of the HSVDG, the faculty interested in CFD are working to

develop better numerical models to represent various fluid-dynamic phenomena and to develop improved numerical schemes for generating flowfield solutions. These Academy researchers are working to provide

improved tools to the designers of future Air Force weapons systems.

For more information, contact the principal investigator:

Dr John J. Bertin
HQ USAFA/DFAN
2354 Faculty Drive, Suite 6H27
USAFA CO 80840
BertinJJ.DFAN@usafa.af.mil
(719) 333-4010

Department Research News

Department of Astronautics

Lunar Transfer Trajectory Research

The USAFA has been conducting research on a new spacecraft trajectory over the past several years. This new trajectory, a ballistic lunar transfer (BCT), allows spacecraft to be sent to the Moon using less fuel than traditional transfers. Future missions to the moon could implement this method to help make the spacecraft smaller or increase the payload. However, finding the possible BCT's for a given mission is very difficult to do, which can cause this trajectory option to be ruled out early in the design process. Also, the amount of fuel needed to make correction burns during the transfers is currently difficult to estimate. The fuel needed for a theoretical transfer can be calculated fairly easily once a BCT is found, but due to many different error sources, extra fuel is necessary for trajectory corrections along the way.

Research in the Department of Astronautics has dealt with finding these BCT's and determining how much fuel is needed for corrections. The most progress so far has been in the area of finding the orbits, given an initial date. Although analytic solutions have proven to be too complex so far, numerical analysis of several thousand orbit integrations has allowed some general characteristics of these orbits to be revealed. These characteristics help a great deal in generating potential mission BCT's.

Department of Behavioral Sciences and Leadership

Human Factors and Simulation

LCDR Russell Shilling (USN) was elected to Chair the DoD Human Factors Engineering Technical Advisory Group (DoD HFETAG), a three year commitment. He will take over the Chair position in May 1999. The DoD HFETAG is responsible for coordinating Human Factors Engineering Research projects and fostering cooperative research between the Army, Navy, Air Force, FAA, and NASA. He has also been awarded \$15K from the Office of Naval Research to help develop spatialized (3-D) auditory displays for a virtual environments Surface Warfare trainer under development at the Naval Air Warfare Center Training Systems Division in Orlando, FL. LCDR Shilling is writing a chapter for a Virtual Environment's Handbook in collaboration with Dr. Barbara Shinn-Cunningham at Boston University. Through various collaborations, LCDR Shilling has sent cadets on Summer Research to the Naval Aerospace Medical Research Labs and the Naval Postgraduate School. This summer cadets will be sent to the Naval Research Laboratories and the Naval Air Warfare Center Aircraft Division in Patuxent, MD.

Maj Joey Hickox is working with Dr. Jim Barker (DFM) and Brooks AFB in a collaborative effort to examine team performance issues in command and control situations. He has been awarded \$27K in the last two years to establish a new team performance research laboratory here at USAFA. In his second study using an AWACS type control simulation (three-person teams), he is currently examining decision support interfaces, command structure, and information load. Maj Hickox has also been awarded \$10K from AFOSR to examine eye-scanning behavior in expert and novice pilots during tactical VFR navigation. He and C1C Leigh Ottati have just completed the first study and are in the process of analyzing the results to present at the annual meeting of the Human Factors and Ergonomics Society.

Physiological and Performance Psychology

Dr George Mastroianni, Lt Col Bob Berger, Maj Mike Zupan (AH), Maj Pat Bradshaw (DFB), and C1C Jason Zarb-Cousin are working on a project comparing pacing and energy expenditure of runners and mountain bikers on gravel trails at USAFA. With the assistance of Danny Portillo (DFEG), these researchers are using differential GPS to measure speed on terrain segments of varying grade. In conjunction with heart rate monitoring, these measurements will make possible a detailed comparison of the voluntary work rates of runners and bikers on uphill and downhill segments of varying grade. Analyses may suggest pacing strategies to optimize speed and energy expenditure on complex terrain. Additionally, Dr Mastroianni has been awarded \$22.5K from the Soldier Systems Center, US Army Soldier Biological and Chemical Command, to fund research comparing voluntary pacing of individuals with and without backpack loads on hilly terrain. This research will use techniques currently being developed at the USAFA.

Assessment and Attitudinal Research

Col David Porter has been conducting research on institutional assessment techniques involving faculty and cadets, primarily using Peter Senge's "Learning Organization" as a model for integrating the development and assessment of educational outcomes with the values of higher education. Lessons learned from this line of inquiry include the following: diverse perspectives and positions enhance assessment effectiveness; knowledge, skills and attitudes are all important and measurable; imperfection is an inherent characteristic of measuring meaningful outcomes; ease of measurement is usually inversely proportional to significance; group work is not a pedagogical panacea; and convergence provides the best foundation for validity.

Maj Kristen Vance has been studying the dynamics of prejudice, with a specific focus on understanding the process

USAFA Discovery #1999-01 (Jan-Mar 99)

by which people reduce prejudiced behavior. Maj Vance investigates variables which promote prejudice reduction and variables which hinder prejudice reduction. She has also launched a research program to examine the predictors and consequences of achievement goals in leadership positions.

Maj Randy Gibb is currently working on a project regarding self-efficacy. His research involves surveying cadets participating in boxing, wrestling, swimming, and women's self-defense. A pre-test, post-test, and post-post-test survey is the procedure. Each survey consists of 28 questions with different sub-groups of self-efficacy questions: physical, assertiveness, coping, determination, and leadership. Maj Gibb is also working on a proposal for AETC funding to research airmanship while in pilot training in both Naval and Air Force training programs. The research will be completed while at the Naval War College.

Department of Foreign Languages***Air Force Language Link - On-Line Russian Language Maintenance and Development***

The On-line Russian Language Maintenance and Development, superintended by Major Stanley Supinski, employs three common educational and communication technologies--the internet, compact disk, and email -- to explore the feasibility of conducting Russian Language maintenance and development in a distance learning mode. Thirty subjects across the Air Force--from Misawa AB, Japan to Langley AFB, Virginia--and several who are deployed or TDY (Bosnia, Vicenza, and others), are participating in the 24-week course. The students will work in cooperative teams of five, using interactive courseware obtained primarily from a CD. They will also interact with each other and a native-Russian course moderator located in Colorado Springs, as well as receive additional, dynamic lessons from a course bulletin board. This truly virtual classroom and course should make optimal use of these technologies while reducing the need to send personnel for expensive in-residence courses. The course also supports the Air Force strategy of "Global Engagement" by increasing Foreign Area Officer and other linguists' Defense Language Proficiency Test scores. The study and course will be completed in July 1999.

Publications and Presentations

34th Education Group**Publications:**

CHUN, C. K. S. "A Falling Star: SAINT, America's First Anti-Satellite System." *Quest* Summer 1998.

CHUN, C. K. S. "Winged Interceptor: Politics and Strategy in the Development of the BOMARC Missile." *Air Power History* Winter 98.

FULTON, N. D. and Kern T. T. "Valery Chkalov: Russian Rouge." *Darker Shades of Blue: The Rouge Pilot* Winter 1999.

FULTON, N. D. "Japan." *The Encyclopedia of the Vietnam War: A Political, Social, and Military History* Winter 1999.

KRUPNICK, C. A. Book review of *Security Dilemmas in Russia and Eurasia*. *European Security* Autumn 1998.

Presentations:

KRUPNICK, C. A. "Decommissioned Russian Submarines and a Model for International Environmental Cooperation." Third Pan-European Intentional Relations Conference and Joint Meeting with the International Studies Association, Vienna Austria, 16-19 Sept 1998.

LAMBERT, S. P. "NATO Enlargement and the Baltic States: In the Interest of European Security." INSS 1998 Research Results Conference, USAFA CO, 19-20 November 98.

SMITH, L. A., Rueb, J. D., Campbell, A., Leber, L., and McChesney, J. "Is the Academy Achieving Its Educational Goal," Pikes Peak Educational Innovations and Research Symposium, USAFA CO, 20-22 January 1999.

Department of Aeronautics**Publications:**

BERTIN, J. J., R. E. Gilbert, S. C. Pluntze, T. W. Pesek, and D. P. Lee. "Flowfield for Rectangular Fins of a Generic Missile Configuration, Part B: Pressures." *USAFA DFAN Report 98-03* October 1998.

DOWTY, J. C. and T. R. Yechout. "Operational Impact Predictions of USAFA Recommended Drag Reduction Modifications for the AC-130U Gunship." *USAFA DFAN Report 98-04* Oct 98.

FALK, E. A., E. J. Jumper, M. K. Fabian and B. A. Haven. "A Characterization of the Unsteady Velocity Field Aft of the F109 Turbofan Rotor." *AIAA Paper 99-0237*. 37th Aerospace Sciences Meeting and Exhibit, Reno, NV, January 1999.

FORSYTHE, J. R., K. A. Hoffmann and Y. B. Suzen. "Investigation of Modified Menter's Two-Equation Turbulence Models for Supersonic Applications." *AIAA Paper 99-0873*, 37th Aerospace Sciences Meeting and Exhibit, Reno, NV, January 1999.

GUY, Y., J. A. Morrow, and T. E. McLaughlin. "Control of Vortex Breakdown on a Delta Wing by Periodic Blowing and Suction." *AIAA Paper 99-0132*, 37th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 1999.

HAMMOND, C. B. "An Experimental Wind Tunnel Investigation to Reduce the Drag on the AC-130U Gunship." *AIAA Paper 99-0008*, 37th AIAA Aerospace Sciences Meeting, January 99.

IWANSKI, K. P., and R. C. Nelson. "The Aerodynamics of Forebodies Undergoing Longitudinal Motions." *AIAA Paper 99-0987*, 37th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 1999.

PLUNTZE, S. C., M. E. Zuber, J. J. Bertin, and R. E. Gilbert. "Flowfield for Rectangular Fins of a Generic Missile Configuration." *AIAA Paper 99-0993*, 37th AIAA Aerospace Sciences Meeting, Reno, NV, January 1999.

SUZEN, Y. B., K. A. Hoffmann and J. R. Forsythe. "Application of Several Turbulence Models for High Speed Shear Layer Flows."

AIAA Paper 99-0933, 37th Aerospace Sciences Meeting and Exhibit, Reno, NV, January 1999.

YECHOUT, T. R. and J. C. Dowty. "A Wind Tunnel Investigation of the Incremental Drag Associated with External Protuberances on the AC-130H Gunship." *USAF A DFAN Report 99-02* February 1999.

YECHOUT, T. R., C. B. Hammond, J. C. Dowty and D. Timpson. "Setting the Foundation for Flight Test - The AC-130U Gunship Drag Reduction Program." *SAE/AIAA Technical Paper 985632*, 1998 SAE/AIAA World Aviation Congress, September 1998.

ZUBER, M. E., M. C. Towne, A. J. Chen, J. J. Bertin, and R. J. Butler. "Aerothermodynamic Environment for a Generic Missile." *Journal of Spacecraft and Rockets*, January-February 1999, 36.1.

Presentations:

BAUGHN, J. W., J. E. Mayhew, R. B. Rivir, R. J. Butler, A. R. Byerley. "A Laser Thermal Tuft For Observing Flow Separation on a Turbine Blade." 1998 International Mechanical Engineering Congress, Anaheim, CA, Nov 98.

BYERLEY, A. R. "Self Assessment in the Department of Aeronautical Engineering at the USAF Academy." Mercer University School of Engineering Faculty Forum, Macon, GA, November 98.

DOWTY, J. C. and T. R. Yechout. "Drag Reduction on the AC-130H Gunship." Presented to the Chief Engineer (Dr. Thomas Christian) and staff of the AC-130H SPO, Warner Robbins AFB, GA, January 1999.

GUY, Y, J. A. Morrow, and T. E. McLaughlin. "Progress in Control of Delta Wing Vortex Breakdown." Invited presentation, University of Arizona, Tucson, AZ, February 1999.

HAMMOND, C. B. "An Experimental Wind Tunnel Investigation to Reduce the Drag on the AC-130U Gunship." 37th AIAA Aerospace Sciences Meeting, January 1999.

MCLAUGHLIN, T.E., and M.G. Brown. "Modular Airborne Fire Fighting System Modeling and Modification." Presented to the 302 ALW/CC, USAFA CO, November 1998.

YECHOUT, T. R. and J. C. Dowty. "AC-130U Drag Reduction." Presented to the AFSOC Staff, Hurlburt Field, FL, January 1999.

YECHOUT, T. R., E. Gilbert, and J. C. Dowty. "AC-130H Drag Reduction Program." Presented to the AFSOC/CC - MGen Holland, USAFA CO, October 1998.

YECHOUT, T. R. "A Drag Reduction Effort to Improve the Operational Capability of the AFSOC Gunship Fleet." USAFA AIAA Student Chapter Invited Presentation, USAFA, CO, September 1998.

Department of Astronautics

Publications:

BELLE, G. B., T. D. Powell, P. D. Martzen, S. B. Sedlacek, and C. Chao, "GPS Signals in a Geosynchronous Transfer Orbit: "Falcon Gold" Data Processing." Proceedings of the Institute of Navigation (ION) 1999 Technical Meeting, San Diego, California, January 1999.

Presentations:

BELLE, G.B. and B. C. Chesley, "Falcon Gold: The Air Force Academy's GPS Flight Experiment." Core Technologies for Space, Colorado Springs, Colorado, November 1998.

CHESLEY, B.C., "FalconSat: The Air Force Academy Small Satellite Program." Invited Presentation, Core Technologies for Space Symposium, United States Space Foundation, Colorado Springs, Colorado, November 1998.

CHESLEY, B.C., "Developing an Integrated Curriculum for Small Satellite Design." American Society of Engineering Educators Annual Conference, Colorado Springs, Colorado, June 1998.

CINNAMON, J.D., "An Analysis of Rod Penetration Of Semi-Infinite Targets Using An Average Pressure Estimate." 1999 American Society of Mechanical Engineers Pressure Vessels and Piping Conference, August 1998.

LISOWSKI, R.L., A.T. Chamillard, and R.R. Young, "Using Ada in Non-Computer Science Majors." SIGAda '98, 8-12, Washington, DC., November 1998.

Department of Behavioral Sciences and Leadership

Publications:

BERGER, R.C., Jones, S.K., & Carlson, K. Instructor Guide for M. H. Ashcraft's *Fundamentals of Cognition*, 1998.

GIBB, R. W. *Aviation Psychology*. McGraw-Hill Companies, Inc., Primis Custom Publishing, New York, NY, 1998.

GIBB, R. W. "Undergraduate human factors curriculum and introductory human factors course content." *Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting*. Santa Monica, CA, 1998.

HENDRIX, W.H., J. D. Rueb, and R. P. Steele. "Sexual Harassment and Gender Differences." *Journal of Social Behavior and Personality* Fall 1998.

HICKOX, J.C., Turner, S.L. & Aretz, A.J. "Technology in the classroom: a web-based approach to teaching advanced human factors." *Proceedings of the 42nd Annual Meeting of the Human Factors and Ergonomics Society*. Santa Monica, CA: Human Factors Society, 1998.

KERN, T. & Gibb, R. W. *Mentoring flight discipline*. In T. Kern, (Ed.), *Flight Discipline*. McGraw-Hill, New York, NY, 1998.

MCCOY, S. & Porter, D.B. "Moral Judgments: influences and effects." *Proceedings: Sixteenth Applied Behavioral Sciences Symposium*. USAFA-TR 98-1, 1998.

PORTER, D.B. "Educational Outcomes Assessment: the good, the bad, and the ugly." *Adult Assessment Forum; Journal of Quality Management in Adult-Centered Education*. Vol VIII, 2, 1998.

PORTER, D.B. "The integrality of assessment in Indicators of Success in Postsecondary SMET Education: Shapes of the Future." *Synthesis and Proceedings of the Third Annual NISE Forum*. (S.B. Millar, Ed.) University of Wisconsin-Madison: National Institute for Science Education. 95-100, 1998.

PORTER, D.B. & Eisenhut S.M. "An Integrated Approach to Educational Outcomes Assessment" *The Best of Adult Assessment Forum 1991-1997*. Phoenix AZ: The Phoenix Institute, 1998.

PORTER, D.B. & Sergel, D.G. "Institutional Assessment: the Indispensability of Diversity." *Proceedings: Sixteenth Applied Behavioral Sciences Symposium*. USAFA-TR 98-1, 1998.

PROCHASKA, F. J., Aretz, A. J., & Berger, R.C. Enhancing course and curriculum design through better problem solving. *Proceedings of*

USAFA Discovery #1999-01 (Jan-Mar 99)

the Sixteenth Biennial Applied Behavioral Sciences Symposium, 282-285, 1998.

SCHREIBER, B.T., Wickens C.D., Renner, G.T., Alton, J., Hickox, J.C. "Navigational checking using 3D maps: The influence of elevation angle, azimuth, and foreshortening." *Human Factors*, 40, 209-222, 1998.

SHILLING, R.D., Wightman, D., Couch M., Beutler, R. and Letowski, T. "The Use of Spatialized Auditory Displays in an Aviation Simulation." *Proceedings of the 16th Applied Behavioral Sciences Symposium*, Colorado Springs, CO, 1998.

SHILLING, R.D., Letowski, T., Wightman, D., & Storms R. "Tri-service cooperation in advanced auditory display research." *Proceedings of the 40th Department of Defense Human Factors Engineering Technical Advisory Group Meeting*, Alexandria, Va., 1998.

UTTAL, W. R. and Gibb, R. W. On the psychophysics of night vision goggles. In R. Hoffman, ed., *Remote Sensing*.

Presentations:

DEANGELIS, D., Shilling R.D., Rupert A., & McGrath, B. "Using 3-D Auditory Cues in a Rotary-Motion Environment." *Poster presented at the 16th Applied Behavioral Sciences Symposium*, Colorado Springs, CO, April 1998.

DRUMMOND, J.T. "Relationships Between Cognitive Hardiness, Perceived Stress, Depression, and Academic Performance." *Poster presented at the 16th Applied Behavioral Sciences Symposium*, USAFA, CO, April 1998.

DRUMMOND, J.T. "Cognitive Hardiness and Performance, Illness, and Neuroendocrine/Cardiovascular Function in UH-1 Pilots." *Poster at 24th International Congress of Applied Psychology*, San Francisco, CA, Aug 98.

PORTER D.B. "The integrality of assessment." *National Institute for Science Education National Workshop No. 6*. Washington, DC, 23 February 1998.

PORTER D.B. "Fundamentals of educational outcomes assessment." *American Association of Colleges and Schools of Business National Conference on Assessment*. Nashville, TN, 16 March 1998.

PORTER D.B. "Educational Outcomes Assessment: What, Why, and How?"

Preconference Workshop. Sixth Annual Colorado Higher Education Assessment Conference. Golden CO, 9 April 1998.

PORTER, D.B. "Using your temperament to enhance counseling effectiveness." *Workshop for Annual USAFA Flight Specialist Training*. USAF Academy, CO, 18 May 1998.

PORTER, D.B. "The inspiration and development of future leaders." *Civil Air Patrol Regional Workshop*. USAFA, CO, 10 July, 1998.

PORTER D.B. "Using Assessment to Enhance Educational Effectiveness." *Workshop for St Louis Community College System*. St Louis, MO, 29 June 1998.

PORTER, D.B. "Learning Organizations as a Framework for Individual and Organizational Development." *Workshop for United States Automobile Association, Organizational Development Directorate*. San Antonio TX, 21 July 1998.

PORTER, D.B. "Using Assessment to Enhance Educational Effectiveness." *Workshop for School of Business, University of California, Sacramento*, CA, 28 August 1998.

PORTER, D.B. "USAF Academy's Lessons Learned from a Decade of Educational Outcomes Assessment: Institutional Effectiveness." *Outcomes Assessment and Institutional Research Conference sponsored by National Defense University*. Dam Neck, VA, 7 Oct 98.

PORTER, D.B. "Using Assessment to Enhance Educational Effectiveness." *Workshops for University of California, San Marcos*. San Marcos, CA, 31 October & 2 November 1998.

SHILLING, R.D. "Spatialized Audio in Virtual Environments Applications: Surface Warfare Trainer." *Virtual Environments in Training Technology Technical Advisory Group Meeting*, Monterey, CA, January 1999.

Department of Biology

Publications:

ROSS, M.D. "Delayed Onset Muscle Soreness: Work Out Now, Pay Later?" *The Physician and Sports Medicine*. 1999. 27 (1): 107.

VALLEY, P.J. "Environmental Security in the Czech Republic: Status and Concerns in the Post-Communist Era." *INSS Occasional Paper #22*, October 1998.

Presentations:

BLACK, S.E. "Nutritional Supplements and Ergogenic Aids" AF Space Command Health Promotion and Fitness Conference, Colorado Springs, CO. October 1998.

DEFUSCO, R.P. "Bird Migration." Winter Ecology, University of Colorado-Colorado Springs, CO, January 1999.

KRUEGER, J.A. "Ecology Education for Military Leaders." University of Minnesota Natural Resources Department, MN, January 1999.

NOYD, R.K. "Plant Responses to Cold and Freezing Temperatures." Winter Ecology, University of Colorado-Colorado Springs, CO, January 1999.

PIGAGE, H.K. "Insect Cold Tolerance." Winter Ecology, University of Colorado-Colorado Springs, CO, January 1999.

PUTNAM, J.L. "North Central Association Self Study Report." Pikes Peak Educational Innovations and Research Symposium, USAF Academy, CO, January 1999.

PUTNAM, J.L. and R.K. NOYD. "Fitting Courses Together to Make a Better Curriculum." Pikes Peak Educational Innovations and Research Symposium, USAFA, CO, Jan 99.

ROSS, M.D. "Physical Therapy and Functional Outcomes for Patients with Low Back Pain." American Physical Therapy Association's Combined Section Meeting, Seattle, WA, Jan 99.

ROSS, M.D. "Reliability of Apley's Range of Motion Test and Dominant and Nondominant Upper Extremity Differences." American Physical Therapy Association's Combined Section Meeting, Seattle, WA, January 1999.

UNANGST, E.T. "Overwintering in Small Mammals: Energy Storing versus Energy Sparing." Winter Ecology, University of Colorado-Colorado Springs, CO, January 1999.

VALLEY, P.J. "Environmental Security in the Czech Republic: Status and Concerns in the Post-Communist Era." 5th Annual INSS Research Results Conference, USAFA, CO, Nov 98.

WESTMORELAND, D.A. "Recruitment: What Factors Influencing Recruitment Should Be Considered in Developing a Model of Mourning Dove Population Dynamics in the Central

USAFA Discovery #1999-01 (Jan-Mar 99)

Management Unit?" Central Management Unit Mourning Dove Workshop, Lawton, OK, Feb 99.

Department of Chemistry**Publications:**

MORGAN, M. E., and J. R. Amend. "Making Chemical Measurements Using the LabWorks Interface and a Handheld Graphing Calculator." *The Chemical Educator* October 1998.

Presentations:

CASTLE, P. J., L. D. Strawser, and K. E. Goeringer. "The Chemistry Department's Role in Teaching Ethics at USAFA." 15th Biennial Conference on Chemical Education of the Division of Chemical Education of the American Chemical Society Waterloo, Ontario, Canada 9 August 1998.

LEE, S. S., and L. P. Zawada. "The Combined Use of Modeling, Chemical Analysis and Morphological Observations to Derive the Degradation Mechanisms in a Continuous Nicalon Fiber Reinforced Ceramic Composite Containing Boron." Gordon Research Conference on Solid State Studies and Ceramics, Meriden, NH, 2 August 1998.

RACICOT, R. J., and J. S. Wilkes. "USAFA's Material Science Program." Materials Research Society Meeting, Boston, MA, 4 December 98.

SEMKEN, S. A. "Rooted in the Earth: Culturally-Integrated, Place-Based Teaching." Geological Society of America Meeting Toronto, Canada, 1 October 1998.

WILKES, J. S. "Chemistry Of and In Room Temperature Ionic Liquids." Department of Chemistry, University of Mississippi, Oxford, MS, 16 October 1998.

WILKES, J. S. "Chemistry Of and In Room Temperature Ionic Liquids." Dept of Chemistry, University of Alabama Tuscaloosa, AL, 15 October 1998.

WILKES, J. S. "Nonlinear Optical Molten Salts." Dept of Chemistry, State University of NY at Buffalo, Buffalo, NY, 26 October 1998.

Department of Computer Science**Publications:**

YOUNG, R. R., K. Bauer and J. Shedden. "Multivariate Analysis and Statistical Process

Control for Steering Wheel Manufacturing." *Quality Engineering Journal* October 1998.

CHAMILLARD, A. T., R. J. Lisowski and R. R. Young. "Using Ada in Non-CS Majors." *Proceedings of the ACM SIGAda Annual International Conference (SIGAda '98)* Nov 98.

SURDU, J. R., G. D. Haines and U. W. Pooch. "OpSim: A Purpose-Built Distributed Simulation for the Mission Operational Environment." *Proceedings of the 1999 International Conference on Web-Based Modeling and Simulation*, January 1999.

Presentations:

CHAMILLARD, A. T., R. J. Lisowski and R. R. Young. "Using Ada in Non-CS Majors." *ACM SIGAda Annual International Conference*, November 98.

SURDU, J. R., G. D. Haines and U. W. Pooch. "OpSim: A Purpose-Built Distributed Simulation for the Mission Operational Environment." *1999 International Conference on Web-Based Modeling and Simulation*, January 1999.

Carlisle, M. C. "RAPID: A Free, Portable GUI Design Tool." *ACM SIGAda Annual International Conference*, November 1998.

Department of Economics and Geography**Publications:**

ALEXEEV, M.V. and R.C. Sikorra. "Comparing Post-Cold War Military Conversion in the United States and Russia." *Contemporary Economic Policy* October 1998.

Presentations:

CARSON, K.S. "Discrete-Choice Modeling of Environmental Security." 1998 INSS Research Results Conference. USAFA, CO, Nov 98.

GRELSON, E.F. "A Climatology of Aircraft Icing Condition Probabilities Based on Historical Radiosonde Data." 1999 Meeting of the American Meteorological Society. Dallas, TX, Jan 99.

HARRIS, J.W., Hart, K.A. and B.E. Heckman. "The Integration of Educational Technologies in a Multidiscipline Geosciences Course." 1999 Meeting of the American Meteorological Society. Dallas, TX, January 1999.

HARRIS, J.W., Hart, K.A. and B.E. Heckman. "Using Focus Groups and Small Group Instructional Diagnosis Methods to Evaluate a Higher Education Courses." 1999 Meeting of the American Meteorological Society. Dallas, TX, January 1999.

HAVERLUK, T.W. "Landscapes of Capsicum." 1998 Conference of Latin American Geography. Santa Fe, NM, October 1998.

LINSTER, B.G., R.L. Fullerton, S. Slate, and M.J. McKee. "Rent-seeking for Public Goods: Experimental Evidence." 1998 North American Meetings of the Economic Science Association. Tucson, AZ, October 1998.

MULLIN, R.D. and G.E. Sohan. "Assessing the Benefits of Classroom Economics Experiments." 1998 North American Meetings of the Economic Science Association. Tucson, AZ, October 1998.

RAPPAPORT, N.J. "Assessing the World Financial Crisis." Institute of Management Accountants, Rocky Mountain Regional Council. Denver, CO, January 1999.

WEST, J.E. and B.G. Linster. "Competing Strategy Types in Repeated Duopoly Games." 1998 North American Meetings of the Economic Science Association. Tucson, AZ, October 1998.

Department of Electrical Engineering**Publications:**

BARRETT, S.F., D.J. Pack, G.W.P. York, P.J. Neal, R.D. Fogg, E.K. Doskocz, S.A. Stefanov, P.C. Neal, C.H.G. Wright, A.R. Klayton. "Student-centered Educational Tools for the Digital Systems Curriculum." 1998 ASEE Annual Conference, Seattle, WA, June 1998.

DEGRAAF, P.W., C.H.G. Wright, M.J. Walker, and T.B. Welch. "An Integrated Approach to Teaching Engineering Courses." *Proceedings of the 1998 ASEE Annual Conference*, Seattle, WA, June 1998.

DEGRAAF, P.W. and J.S. Lehnert, "Performance Comparison of a Slotted ALOHA DS/SSMA Network and a Multichannel Narrow-Band Slotted ALOHA Network." *IEEE Transactions on Communications*, 46.4. April 1998.

DEGRAAF, P.W., S.F. Barrett, and C.H.G. Wright. "A Method to Control Irradiation Time for Laser Photocoagulation on the Retina."

USAFA Discovery #1999-01 (Jan-Mar 99)

Proceedings of the 35th Annual Rocky Mountain Bioengineering Symposium, Copper Mt, CO, April 1998.

MUSSELMAN, R.L. "Personal Responsibility in Collaborative Lab Courses." Proceedings of the 1998 ASEE Annual Conference, Seattle, WA, June 1998.

BERG, E.D., S.F. Barrett, C.H.G. Wright. "The Development of a Hybrid Analog/Digital Retinal Surgical Laser System." Proceedings of the 35th Annual Rocky Mountain Bioengineering Symposium, Copper Mt, CO, April 1998.

PACK, D.J. and S.A. Stefanov. "Fire-Fighting Robot: the United States Air Force Academy Experience." Proceedings of the 1998 ASEE Annual Conference, Seattle, WA, June 1998.

PACK, D.J., A.M. Mankowski, and G. J. Freeman. "A Fire-Fighting Robot and Its Impact on Educational Outcomes." Proceedings of the 1998 ASEE Annual Conference, Seattle, WA, June 1998.

PACK, D.J., A.R. Klayton, A.L. Clark, and J.P. Trudeau. "Incorporating Mobile Robots in an EE Microcomputer Programming Course." Proceedings of the 1998 ASEE Annual Conference, Seattle, WA, June 1998.

PACK, D.J., L.A. Tamburino, and K. Kurtz. "An Optimal Matching Method using Accumulated Evidence." Proceedings of the 1998 International Symposium on Optical Science, Engineering, and Instrumentation, Orlando, FL, April 1998.

SODA, K.S. "Keys to Successful VLSI Realization Through MOSIS." Proceedings of the 1998 ASEE Annual Conference, Seattle, WA, June 1998.

WELCH, T.B., and J.N. Berry. "Teaching Three-Phase Electrical Power Using a Low-Voltage Power Source." Proceedings of the 1998 ASEE Annual Conference, Seattle, WA, June 1998.

WELCH T. B., M.J. Walker, and R.E. Ziemer. "Effects of Directional Antennas with Realizable Beam Patterns on the Spaced-Time Correlation Function." 8th Virginia Tech/MPRG Symposium on Wireless Personal Communications, June 1998.

WRIGHT, C.H.G. and T.B. Welch. "Teaching Real-World DSP Using MATLAB." Proceedings of

the 1998 ASEE Annual Conference, Seattle, WA, June 1998.

WRIGHT, C.H.G., E.D. Oberg, and S.F. Barrett. "Integration of Analog and Digital Retinal Tracking and Coagulation Subsystems." Proceedings of the 35th Annual Rocky Mountain Bioengineering Symposium, Copper Mt, CO, April 1998.

Presentations:

BARRETT, S.F., D.J. Pack, G.W.P. York, P.J. Neal, R.D. Fogg, E.K. Doskocz, S.A. Stefanov, P.C. Neal, C.H.G. Wright, A.R. Klayton. "Student-centered Educational Tools for the Digital Systems Curriculum," 1998 ASEE Annual Conference, Seattle, WA, June 1998.

DEGRAAF, P.W., C.H.G. Wright, M.J. Walker, and T.B. Welch. "An Integrated Approach to Teaching Engineering Courses." 1998 ASEE Annual Conference, Seattle, WA, June 1998.

DEGRAAF, P.W., S.F. Barrett, and C.H.G. Wright. "A Method to Control Irradiation Time for Laser Photocoagulation on the Retina." 35th Annual Rocky Mountain Bioengineering Symposium, Copper Mt, CO, April 1998.

MUSSELMAN, R.L. "Personal Responsibility in Collaborative Lab Courses." 1998 ASEE Annual Conference, Seattle, WA, June 1998.

BERG, E.D., S.F. Barrett, C.H.G. Wright. "The Development of a Hybrid Analog/Digital Retinal Surgical Laser System," 35th Annual Rocky Mountain Bioengineering Symposium, Copper Mt, CO, April 1998.

PACK, D.J. and S.A. Stefanov. "Fire-Fighting Robot: the United States Air Force Academy Experience." 1998 ASEE Annual Conference, Seattle, WA, June 1998.

PACK, D.J., A.M. Mankowski, and G. J. Freeman. "A Fire-Fighting Robot and Its Impact on Educational Outcomes." 1998 ASEE Annual Conference, Seattle, WA, June 1998.

PACK, D.J., A.R. Klayton, A.L. Clark, and J.P. Trudeau. "Incorporating Mobile Robots in an EE Microcomputer Programming Course." 1998 ASEE Annual Conference, Seattle, WA, June 1998.

PACK, D.J., L.A. Tamburino, and K. Kurtz. "An Optimal Matching Method using Accumulated Evidence." 1998 International

Symposium on Optical Science, Engineering, and Instrumentation, Orlando, FL, April 1998.

PACK, D.J. "Assessing Educational Outcomes for an Engineering Course: A Case Study." 1998 Colorado Higher Education Assessment Conference, Golden, Colorado, April 1998.

SODA, K.S. "Keys to Successful VLSI Realization Through MOSIS." 1998 ASEE Annual Conference, Seattle, WA, June 1998.

WELCH, T.B., and J.N. Berry. "Teaching Three-Phase Electrical Power Using a Low-Voltage Power Source." 1998 ASEE Annual Conference, Seattle, WA, June 1998.

WELCH T. B., M.J. Walker, and R.E. Ziemer. "Effects of Directional Antennas with Realizable Beam Patterns on the Spaced-Time Correlation Function." 8th Virginia Tech/MPRG Symposium on Wireless Personal Communications, June 1998.

WRIGHT, C.H.G. and T.B. Welch. "Teaching Real-World DSP Using MATLAB." 1998 ASEE Annual Conference, Seattle, WA, June 1998.

WRIGHT, C.H.G., E.D. Oberg, and S.F. Barrett. "Integration of Analog and Digital Retinal Tracking and Coagulation Subsystems." 35th Annual Rocky Mountain Bioengineering Symposium, Copper Mt, CO, April 1998.

WRIGHT, C.H.G. and T.B. Welch. "Teaching DSP Concepts Using MATLAB and the TMS320C5X." 1998 Texas Instruments DSP Educators and Third-Party Conference, Houston, TX, August 1998.

Department of Engineering Mechanics

Publications:

BALL, J. K., C. R. Stone and R. R. Raine. "Combustion Analysis and Cycle-by-Cycle Variations in Spark Ignition Engine Combustion, Part I: An Evaluation of Combustion Analysis Routines by Reference to Model Data." *Proceedings of the Institution of Mechanical Engineers, Part D, Vol 212 Pt D5, Journal of Automotive Engineering*, London, 1998.

BALL, J. K., C. R. Stone and R. R. Raine. "Combustion Analysis and Cycle-by-Cycle Variations in Spark Ignition Engine Combustion, Part II: A New Parameter for Completeness of Combustion and its Use in Modelling Cycle-by-Cycle Variations in Combustion." *Proceedings of the Institution of Mechanical Engineers, Part*

D, Vol 212 Pt D6, Journal of Automotive Engineering, London, 1998.

JENSEN, D. D., and R. Q. Borchert.

"MSC/Patran Used to Improve Education by Providing Visualization of Stress Concepts," *MSC World*, Feb 99.

Presentations:

BUSH, R. W., R. J. Bucci, and J. K. Donald.

"Pitfalls to Avoid in Threshold Testing and its Interpretation." Symposium on Fatigue Crack Growth Thresholds, Endurance Limits, and Design, ASTM Fall Committee Week, Norfolk, VA, November 5, 1998.

FELAND, J. M., M. L. Nowack, L. J. Leifer.

"Cost-Performance Management Through Knowledge Reuse in Large-scale Defense Projects - Vision and Proposed Architecture", Conference on Design Reuse, EDC 98, Brunel University, June 1998.

JENSEN, D. D., and R. Q. Borchert. "Myers Briggs Based Assessment of Hands-on and Visualization Usage in Mechanics Courses," Pikes Peak Educational Research Conference, USAF Academy, CO, January 1999.

REDFIELD, R. C. "Bond Graphs in Dynamic Systems Design: Concepts for a Continuously Variable Transmission." International Conference on Bond Graph Modeling and Simulation (ICBGM '99), San Francisco, CA, January 1999.

Department of Foreign Languages

Publications:

GUAJARDO, Y. "National Standards for Japanese Language Learning." *Standard for Foreign Language Learning: Preparing for the 21st Century* 1998.

Presentations:

BREHM, A. and B. KLINE. "Creating a Syllabus to Educate and Motivate." Center for Educational Excellence, USAFA, February 1999.

CANTON, R. L. "Multimedia Technology and the WWW to Enhance Classroom Productivity." Colorado Language Technology Consortium, US Air Force Academy, CO, January 1999.

GUAJARDO, Y. "Development & Use of Multimedia Courseware *Using HTML*." Pikes

Peak Educational Innovations and Research Symposium (PPEIRS), USAFA, January 1999.

GUAJARDO, Y., and R. Keaton. "Integrating Content-based Instruction into Intermediate/Advanced Classes: Working Towards National Standards Guided Instruction." The Colorado Japanese Language Education Association Workshop at the University of Colorado in Colorado Springs.

HEINZ, P. J. "Language Learning 2000."

Colorado Language and Technology Consortium Annual Meeting, USAFA, CO, January 1999.

SUTHERLAND, R.L. and T.C. Sutherland.

"Do the Web with Windows: Word, FrontPage 98, Internet Explorer." Technology in Education Conference, Snowmass, CO, July 1998.

SUTHERLAND, R.L., and T.C. Sutherland.

"Free Home Pages for Teachers and Students." Technology in Education Conference, Snowmass, CO, July 1998.

SUTHERLAND, R.L., D. A. Moraco, E.

Donnelly, and S.M. McCormack. "Colorado Language Improvement Project: A Web Archive of Standards, Lessons, and Workbooks." Colorado Conference of Foreign Language Teachers, Colorado Springs, CO, February 1998.

SUTHERLAND, R.L., D. A. Moraco, A. Brehm,

and S.M. McCormack. "Training Students and Teachers in the Web Basics." Colorado Conference of Foreign Language Teachers, Colorado Springs, CO, February 1998.

Department of History

Publications:

RICE, R. R. "Bombing Auschwitz: 15th Air Force and the Military Aspects of a Possible Attack." *War in History* 6.2.

WELLS, M.K. "Balloons." *Encyclopedia of the United States in the 19th Century*, 1998.

Presentations:

ARNOLD, D. C. "Unversed in the Ways of Diplomatic Intrigue: Canada and the Ethiopian Affair, 1935." Missouri Valley History Conference, Omaha, Nebraska, March 1998.

ARNOLD, D.C., Neiberg, M.C. "Teaching World History: Avoiding the Regional Ap-

proach." 1998 World History Association World Conference, Fort Collins, CO., June 1998.

MOYD, M. "Teaching the History of Women and War at the United States Air Force Academy." Women's Research and Education Institute Conference on Women in Uniform, Washington D.C., December 1998.

RICE, R.R. "The Bombing of Auschwitz Controversy: Teaching About Links Between the War and the Holocaust." Conference on Lessons & Legacies V, November 1998.

Department of Law

Publications:

SCHMITT, M. N. "Bellum Americanum: The U.S. View of Twenty-First Century War and Its Possible Implications for the Law of Armed Conflict." *Michigan Journal of International Law*, 1998.

Department of Management

Publications:

BARKER, J.R. "Tightening the Iron Cage: Concertive Control and Self-Managing Teams." In *Qualitative Studies of Organizations*, John Van Maanen (Ed.). Sage Publications, October 1998. This article is one of thirteen selections included in this volume, which reprints the most significant and influential qualitative articles published by *Administrative Science Quarterly* in the last 40 years.

COSTLEY, D. L., Pratt E. and Strbiak C.A.

"Important characteristics for instructor credibility: A longitudinal study." *Refereed Proceedings of the 40th Annual Mountain Plains Management Conference*, Denver, October 1998.

COSTLEY, D. L., and Strbiak C.A. "Student-outcome determined and technology determined education." *Refereed Proceedings of the 40th Annual Mountain Plains Management Conference*, Denver, October 1998.

HEPPARD, K.A. "High Expectations, Supportiveness, and the Management Hall of Fame." *Journal of Management Inquiry*, October 1998.

HEPPARD, K.A., Tompkins, P.K., Melville, C. "Deviance from Normality or the Normalization of Deviance: Making Sense of The Challenger Launch Decision." *Organization*, October 1998.

HEPPARD, K.A. "A guide for academic writers and reviewers." In *Scholarly Writing: A Guide for Authors*. A.S. Huff (Ed.). November 1998.

STRBIAK C. A. and Blass, F.R. "Air expeditionary force: An integrative (Air Force) management exercise." *Refereed Proceedings of the 40th Annual Mountain Plains Management Conference*, Denver, October 1998.

PARCO, J.E., DAVIS, K.J. and GREEN, S.G. "The U.S. Defense Landscape: From Extreme Competitive Advantage to Commoditization." *Proceedings of the Western Economics International Conference*, Lake Tahoe, Nevada, July 1998.

Presentations:

BARKER, J.R. "The Scholarship of Phil Tompkins: 1989 to the Present." National Communication Association, New York, November 1998.

BARKER, J.R. "Collaborating for High Performance." Third Annual Conference on High Performance Organizations, Consortium for High Performance, University of Colorado, Colorado Springs, CO, November 1998.

CHESLEY, J.A., Wenger M.S. and Hall, K. R. "Balancing the 'Balanced Scorecard': The Recursive Adaptation of a Strategic Management and Performance Measurement Model." Strategic Management Society Annual Conference, Orlando FL, November 1998.

JENNINGS, W.W. "Institutional Ownership and Firm Valuation: Evidence on Monitoring." Financial Management Association national meeting, Chicago, IL, October 1998.

JENNINGS, W.W. "Further Evidence on Institutional Ownership and Corporate Value." *Special invitation from program committee.* Southern Finance Association Conference, Marco Island, FL, November 1998.

KING, D.R. "Encouraging Active Student Learning: Making Investing Relevant and Real," 1st Annual Pikes Peak Educational Innovations and Research Symposium, USAFA, CO, January 1999.

KING, D.R. "Interpreting Shadows: Arms Control and Defense Planning in a Rapidly Changing Multi-Polar World." Institute for National Security Studies 6th Annual Research

Results Conference, USAFA, CO, November 1998.

PARCO, J.E. "Excellence in Classroom Teaching." 40th Annual Mountain Plains Management Conference, Denver, October 1998.

STRBIAK, C. A., and Paul J. "All that glitters is not gold: Cognitive structure development and student performance in management education." 1998 Best Paper in Innovative Design Award, Management Education and Development Division, Academy of Management, San Diego, August 1998.

STRBIAK, C.A. "Power & Systems." Pikes Peak Region Chapter of the Project Management Institute, Colorado Springs, CO, October 1998.

THORNTON, J.M. "God scores a '4' on the DIT: Arguments for Lower Stages of Ethical Development as Optimal for the Public Accounting Profession." American Accounting Association's Annual Meeting, New Orleans, August 1998.

Consultations:

GREEN, S.G., J.K. Lowe, and Baker S.F. "Olympic Performance-Based Budgeting: Improving Resource Management at U.S. Swimming," U.S. Olympic Facility, Colorado Springs, CO. January 1999.

Department of Mathematical Sciences

Presentations:

HALL, D. "Efficient Incorporation and Assessment of Written Assignments in to Large Math Courses." Colorado Council of Teachers of Mathematics 1998 Annual Conference, Denver, CO, October 1998.

NEWTON, H. N., and R. M. Block. "25% Manpower (UMD) Reductions at Air Force Management Headquarters." 1998 Air Force Operations Research Symposium, USAFA, CO, October 1998.

SJODEN, G. "Adaptive Discrete Ordinates Differencing." CEA Conference on Parallel Transport, France, October 1998.

WARNER, B. A., and M. Revak. "A Sampling from Statistics." Colorado Council of Teachers of Mathematics 1998 Annual Conference, Denver, CO October 1998.

Publications:

SCHOOFF, R. *Risk Modeling, Assessment, and Management*, Chapter 16. New York, 1998.

CLASEN, R. J., and D. Hall. "Web-based Mathematica Projects for Calculus." *Proceeding from Association for Advancement of Computing in Education*, 1998.

HOLCOMB, T. D., and J. Haefner. "The Picard Group of a Structural Matrix Algebra." *Journal of Linear Algebra and its Applications*, 1998.

NEWTON, H. N., C. Barnhart, and P. Vance. "Constructing Railroad Blocking Plans to Minimize Handling Costs." *Transportation Science* 1998.

WARNER, B. A., and J. Rutledge. "Checking the Chips Ahoy Guarantee." *Chance*. 12. 1. 1999.

WARNER, B. A., and M. Revak. "Meet me in the middle." *Mathematics Teacher*. 12.1. 1999.

Department of Physics

Publications:

TAKEKOSHI, T., B.M. Patterson, R.J. Knize, "Observation of Optically Trapped Cold Cesium Molecules", *Physical Review Letters*, December 1998.

BOROVSKY, J., M.F. Thomsen, D.J. McComas, T.E. Cayton, D.J. Knipp, "Magnetospheric dynamics and mass flow during the November 1993 storm," *J. Geophys. Res*, November 1998.

KOZYRA, J.U., V.K. Jordanova, J.E. Borovsky, M.F. Thomsen, D.J. Knipp, D.S. Evans, D.J. McComas, T.E. Cayton, "Effects of a high-density plasma sheet on ring current development during the November 2-6 1993, magnetic storm," *J. Geophys. Res*, November 1998.

LUI, A.T.Y., D.J. Williams, R.W. McEntire, S.P. Christon, A.B. Gavin, D.J. Knipp, "Energetic Ion composition and charge state of solar wind plasma during the November 3, 1993, magnetic storm," *J. Geophys. Res*, November 1998.

McALLISTER, A.H., D.J. Knipp, N.U. Crooker, T. Mukai, S. Kokubun, "Identification of solar

USFA Discovery #1999-01 (Jan-Mar 99)

drivers: The 3-4 November 1993 geomagnetic storm," *J. Geophys. Res.*, November 1998.

KNIPP, D.J., B.A. Emery, M. Engebretson, X. Li, A.H. McAllister, T. Mukai, S. Kokubun, G.D. Reeves, D. Evans, T. Obara, X. Pi, T. Rosenberg, A. Weatherwax, M.G. McHarg, F. Chun, K. Mosely, M. Codrescu, L. Lanzerotti, F.J. Rich, J. Sharber, P. Wilkinson, "An overview of the early November 1993 geomagnetic storm," *J. Geophys. Res.*, November 1998.

KNIPP, D.J., "Forward" (Special Section on the November 1993 Geomagnetic Storm), *J. Geophys. Res.*, November 1998.

WHITE, W.R., I. Dajani, A.F. Cifuentes, "All-optical programmable switch with XOR gate functions in a doped silica thin film," *Optical Engineering*, October 1998.

WETTERER, C.J., "CCD Photometry of UZ CrB, XX CrB and V864 Her," *Information Bulletin on Variable Stars*, No. 4631, September 1998.

Presentations:

NOVAK, G.M., and E.T. Patterson, "Just-In-Time Teaching (JiTT) with the Web: How Well is it Working? Some Assessment Results," American Association of Physics Teachers winter meeting, Anaheim CA, January 1999.

HEAD, J.H., T.A. Summers, and E.T. Patterson, "Student Expectations for their Second-Semester of Introductory Physics," American Association of Physics Teachers winter meeting, Anaheim CA, January 1999.

HOLLABAUGH, M., and E.T. Patterson, "Mini-Blocks: Increasing Student Interest in General Physics," American Association of Physics Teachers meeting, Anaheim CA, January 1999.

GRUNER, H.M., and G.A. Finney, "Tutorials in Introductory Physics at the United States Air Force Academy," American Association of Physics Teachers meeting, Anaheim CA, January 1999.

CHUN, F.K., D.J. Knipp, G.M. McHarg, G. Lu, B.A. Emery, and S. Vennerstrom, "The Polar Cap Index as a Proxy for Global Joule Heating," American Geophysical Union fall meeting, San Francisco CA, December 1998.

EMERY, B.A., A.D. Richmond, R.G. Roble, A.L. Aruliah, A.D. Aylward, M.J. Buonsanto, B.G. Fejer, M.R. Hairston, R.M. Johnson, R.

Niciejewski, D.J. Knipp, F.J. Rich, J. Schoendorf, M. Sulzer, and C. Tepley, "Thermosphere/Ionosphere Response to the January 1988 Magnetic Cloud," American Geophysical Union fall meeting, San Francisco CA, December 1998.

KNIPP, D.J., F.K. F.K. Chun, G.M. McHarg, and F.J. Rich, "An Assessment of the Auroral Boundary Index (ABI) for Use in Joule Heating Estimates," American Geophysical Union fall meeting, San Francisco CA, December 1998.

LANE C.T., G.M. McHarg, and H.C. Stenbaek-Nielsen, "High Frequency Investigation of Pulsating Aurora," American Geophysical Union meeting, San Francisco CA, December 1998.

PALFERY, S., G.M. McHarg, D. Bell, and H.C. Stenbaek-Nielsen, "Simulation of Wave-Particle Interactions of Precipitating Auroral Electrons," American Geophysical Union fall meeting, San Francisco CA, December 1998.

PATTERSON, E.T., "Using the World Wide Web in Teaching," Presentation and workshop at the Workshop for New Physics Faculty (sponsored by the AAPT and the NSF), College Park MD, November 1998.

PATTERSON, E.T., "Using the World Wide Web for Teaching and Learning Physics - Just in Time," invited colloquium for the Colorado School of Mines Department of Physics, Golden CO, October 1998.

Department of Political Science**Publications:**

BIDLACK, H. "Interagency Cooperation on Environmental Security," policy paper requested by the Pentagon, February 1999.

HALL, G. M., J. T. Cappello, and S. P. Lambert. "A Post-Cold War Nuclear Strategy Model," INSS Occasional Paper, July 1998.

HALL, G. M. "Intersectionality: A Necessary Consideration for Women of Color in the Military?" in *Beyond Zero Tolerance: Discrimination in Military Culture*, eds. Mary Fainsod Katzenstein and Judith Reppy (Lanham, MD: Rowman and Littlefield, 1999).

MCCARTHY, J. P. "Report on Information Management to Support the Warrior," Scientific Advisory Board, December 1998.

ULRICH, M. "The Democratization of Civil-Military Relations in the Czech Republic," in *The Military and Society in the Former Eastern Bloc*, eds. Constantine P. Danopoulos and Daniel Zirker (Boulder, CO: Westview Press, 1999).

Presentations:

KISER, S. "Chinese Environmental Security: Challenges and Opportunities in the 21st Century," at the Comprehensive Security in the 21st Century East Asian Commonwealth Conference sponsored by University of Hawaii and the University of Osaka, February 1999.

KNOTT, S. F. "The Great Transformation: Intelligence Oversight and the Republican Party," International Studies Association Annual Conference, February 1999.

LONG, M. "Global Leadership, Challenge, and Coalition Creation: The United States, China, and the ASEAN Regional Forum," International Studies Association Annual Conference, February 1999.

MCCARTHY, J. P. "Information Management to Support the Warrior," INSS Conference, December 1998.

MCCARTHY, J. P. "The Wild Blue Yonder," USAFA PS 211 cadets, December 1998.

PILCH, F. "Does Africa Matter?" Colorado Springs World Affairs Council Annual Symposium, October 1998.

ULRICH, M. "NATO's Transformation in the Post-Cold War World," Jackson School of International Studies Pacific Northwest Colloquium on International Security at the University of Washington, January 1999.

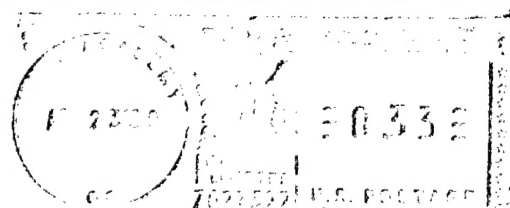
ULRICH, M. "Democratization and Civil-Military Relations in Central and Eastern Europe," Jackson School of International Studies Pacific Northwest Colloquium on International Security at the University of Washington, January 1999.

ULRICH, M. "NATO's Identity at a Crossroads: Institutional Challenges Posed by NATO's Enlargement and Partnership for Peace Programs," International Studies Association Annual Conference, February 1999.

To learn more about research at the United States Air Force Academy, we encourage you to visit our Web site at www.usafa.af.mil/dfe. If you want to focus on a particular department or effort you might want to contact the associated Department Research Director. Each phone extension is preceded by (719)-333 commercial or 333 DSN. Each e-mail is followed by @usafa.af.mil

| | | | | |
|---|----------------------|------|----------------|--|
| <i>Institute for National Security Studies</i> | Dr. James M. Smith | 2717 | SmithJM.dfe | www.usafa.af.mil/inss |
| <i>Institute for Information Technology Applications</i> | Lt Col Earl McKinney | 6941 | McKinneyEH.dfe | www.usafa.af.mil/ita |
| <i>Air Force Humanities Institute</i> | Maj Thomas Krise | 3930 | KriseTW.dfeng | |

ATTN: DTIC-OMI
8725 JOHN J KINGMAN RD STE 0944
FT BELVOUR VA 22060-6218

[illegible]